



Setti D. Warren
Mayor

City of Newton, Massachusetts
Department of Planning and Development
1000 Commonwealth Avenue Newton, Massachusetts 02459

Telephone
(617) 796-1120
Telefax
(617) 796-1142
TDD/TTY
(617) 796-1089
www.newtonma.gov

Candace Havens
Director

PUBLIC HEARING MEMORANDUM

Public Hearing Date:	April 25, 2011
Zoning and Planning Action Date:	To be determined
Board of Aldermen Action Date:	To be determined
90-Day Expiration Date:	To be determined

DATE: April 22, 2011

TO: Alderman Marcia T. Johnson, Chairman, and
Members of the Zoning and Planning Committee

FROM: Candace Havens, Director of Planning and Development
Jennifer Molinsky, Chief Planner for Long-Range Planning
Seth Zeren, Chief Zoning Code Official

RE: **Public Hearing: Petition #17-11.** *Terrence P. Morris, Joseph Porter, Bruce Bradford, George Collins, Verne T. Porter, Jr., and Michael Peirce, proposing an amendment to the zoning ordinance for the purpose of changing the definition of "Grade Plane" and adding a new definition of "Average Grade."*

CC: Mayor Setti D. Warren
Board of Alderman
John Lojek, Commissioner, Inspectional Services Department
Marie Lawlor, Assistant City Solicitor
Planning and Development Board

The purpose of this memorandum is to provide the Board of Aldermen, Planning and Development Board, and the public with technical information and planning analysis which may be useful in the decision making process of the Board. The Planning Department's intention is to provide a balanced view of the issues with the information it has at the time of the public hearing. There may be other information presented at or after the public hearing that the Zoning and Planning Committee of the Board of Aldermen will consider in its discussion at a subsequent Working Session.

I. Background and Summary

On February 28, 2011, the Committee heard from the petitioners of item #17-11, which relates to the definition and measurement of “grade plane.” The petition was docketed in response to concerns by local surveyors that the existing definition was confusing and prone to divergent interpretations. The petitioner proposed a new “length-weighted mean” method of calculating grade plane from which building height is calculated. In a working session March 28, 2011, the Planning and Development Department presented their analysis of the proposed “length-weighted mean” approach and the Committee discussed the idea.

The Planning Department agrees that the current definition of grade plane can be improved with length-weighted mean method proposed in petition #17-11, though the Department has recommendations for the specific language as discussed in this memo. The Planning Department further recommends that this petition be considered together with petition #65-11, proposing a change to the Zoning Ordinance’s definition of “height,” as the two items are closely related.

II. Current Grade Plane Definition

Grade plane is a plane of constant elevation that is calculated from points surrounding a structure. The “average grade plane” is the baseline from which maximum allowed height is measured (per the definition of height in Section 30-1 of the Newton Zoning Ordinance). The higher the grade plane, the higher a structure can be.

Figure 1.

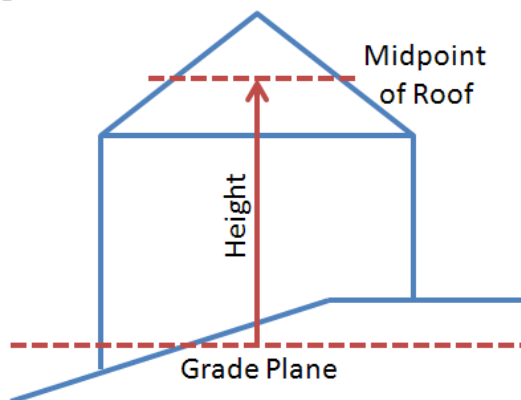
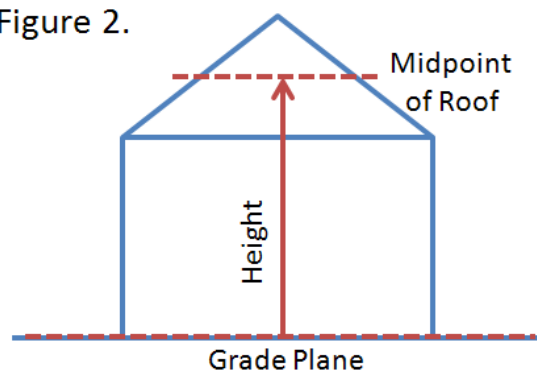


Figure 2.



Figures 1 and 2 show how grade plane establishes the baseline for the measurement of maximum allowed height. Maximum allowed height is measured from the grade plane. A higher grade plane calculation leads to a taller building if built to allowable height. (As currently defined in the Newton Zoning Ordinance, height is measured to the midpoint of the roof peak and the intersection of the roof plane and the wall plane, though Ordinance 65-11, currently under consideration, recommends a change to the measurement of height.)

Grade plane is also used in determining whether a story counts as a basement or a first story, of particular interest on sloping lots where large portions of basement walls are above grade (such as walk-out basements). Whether or not a story counts as a basement is meaningful for FAR calculations

(both under the current FAR system and the system coming into effect on October 15, 2011) and because the Zoning Ordinance excludes basements from the maximum allowed number of stories.

In December of 2010, ISD issued a clarification of the current definition (see Appendix C). The current definition of grade plane in the Zoning Ordinance is as follows (with interpretation of this language used by the Inspectional Services Department in parentheses in bold):

Sec. 30-1 Grade Plane: A reference plane for a building or structure as a whole **(that is, a plane that encircles the building or structure)** representing the average of finished ground level adjoining the building or structure at all exterior walls **(at least one measurement must be taken at each exterior wall)**. In calculating said reference plane, the elevation of each point used to calculate said average shall be determined by using the lowest elevation of finished ground level with in the area **(wall)** immediately adjoining the building or structure **(flush against the wall)** and either the lot line or a point six (6) feet **(perpendicular)** from the building or structure, whichever is closer to the building or structure, as illustrated in the diagrams below.

As a result, a measurement of a rectangular building with four exterior walls requires at least eight measurements: one flush against each wall at the lowest point (four total) and one six feet out from those four spots (for a total of eight) (see Figure 3 below).

Figure 3a.

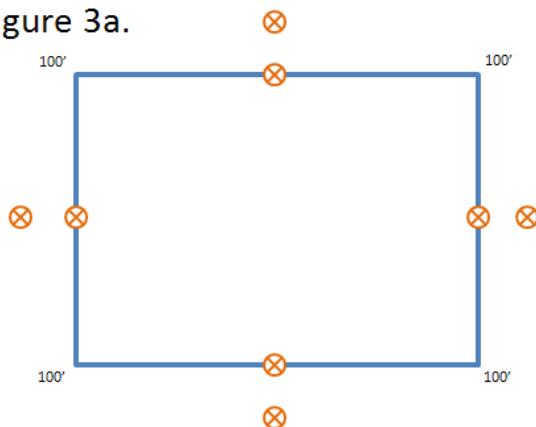
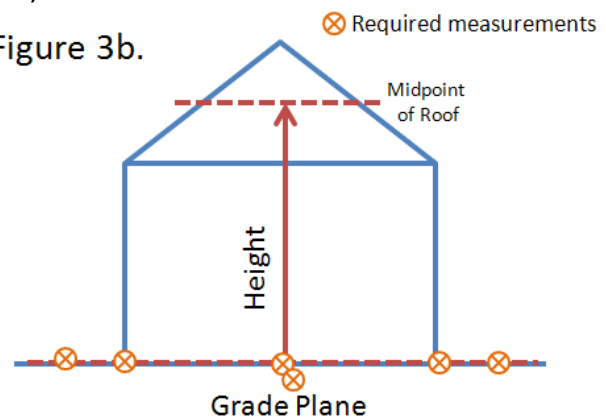


Figure 3b.



Figures 3a and 3b show how grade plane is measured on a flat lot (consistent elevation 100'). Figure 3a is an overhead view showing all eight required measurements. Figure 3b shows a cross section of the same structure showing the required measurements.

According to the Inspectional Services Department (ISD), there are two related problems with the current definition of “grade plane” in the Zoning Ordinance:

1. **The calculation of grade plane, as defined in the current Zoning Ordinance, is confusing and can be used by those measuring it to produce a more desirable base from which to measure height.** Over the years, ISD has regularly received plans from engineers who have used a variety of interpretations of the Zoning Ordinance’s definition of grade plane in their calculations. The measurements have been inconsistent and difficult to verify. To remedy this problem, ISD issued detailed guidance in December 2010, based on a close reading by ISD and the Law

Department of the existing definition of “grade plane,” to ensure a more standardized application of the grade plane definition. (See Attachment A).

2. **When the definition of grade plane is applied as directed by the existing definition, it may not produce an *average* grade.** Instead, it can produce a grade plane that is actually *lower* than the average grade around a property. Under the current definition, the grade plane calculation may not result in a true average grade on a sloping lot, because the measurements must be taken at the *lowest* elevation on a given side. A simplified example (see Figure 4 below) assumes that the property slopes evenly from 100’ in the front to 90’ in the rear. Under the current grade plane definition, the measurements would be taken at the lowest point of each wall (both against the wall and six feet out). Averaging these eight points produces a lower grade plane (92.5 feet) than the true average (95 feet) of all the elevations.

Figure 4a.

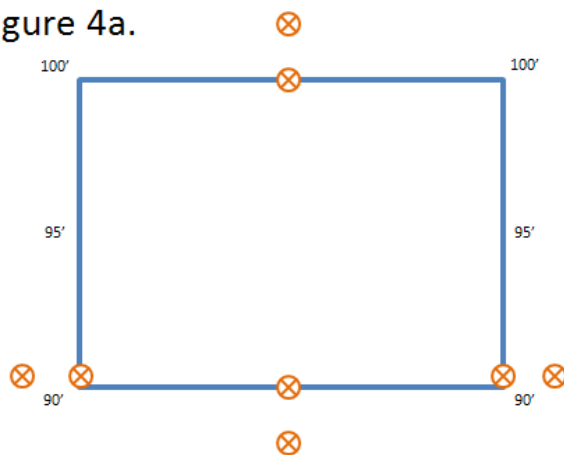
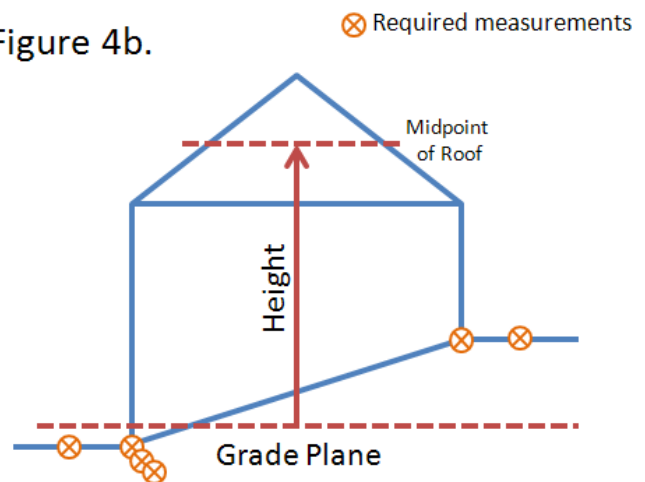


Figure 4b.



Figures 4a and 4b show how grade plane is measured on a sloping lot (elevation 100’ on the top [4a] or right [4b] sloping down to elevation 90’ on the bottom [4a] or left [4b]). Figure 4a is an overhead view showing all eight required measurements. Figure 4b shows a cross section of the same structure showing the required measurements. The preponderance of measurements required are at the bottom of the slope, which results in a lower-than-average grade plane measurement.

History

A definition of “grade plane” was first added to the Newton Zoning Ordinance in 1997 as part of Ordinance Number V-111, which also amended the definition of “height” and lowered the allowed height in residential districts. The definition in 1997 read:

Grade plane: A reference plane representing the average of finished ground level adjoining the building at all exterior walls.

Based on a Planning Department memo from that time, this definition was created to serve as a baseline for a revised height definition. The whole package, which focused mainly on height regulation, was proposed and approved in response to concerns over the loss of historic homes to large, out-of-scale residential development, enabled in part due to the prior definition of “height” (see the April 22, 2011 Public Hearing memorandum for Petition #65-11 for more detail.)

In 1999, the 1997 definition was revised through Ordinance Number V-247. This revised definition remains our current definition of grade plane. This amendment was the first to provide a method for *calculating* grade plane. The previous definition, which did not give a method for calculating grade plane, allowed for the possibility of mounding earth near the foundation to achieve a higher grade plane and increased height. The revised definition required the surveyor to take the lowest point *up to six feet out from the structure* to eliminate manipulation of the height regulations through mounding. See Appendix B for a full history of prior amendments to the grade plane definition.

II. The Proposal

In order to improve the calculation of grade plane, Petition #17-11 proposes replacing the current definition with a “length-weighted mean” method similar to that used by the Town of Weston. The length-weighted mean approach calculates an average of all the grades along all the walls of the building. Measuring grade plane with a length-weighted mean approach involves the following steps:

1. Identifying segments of consistent grade or slope (see Figure 5);
2. Averaging the elevations of the ends of each segment to calculate the segment average grade;
3. Multiplying the average grade of each segment by the length of the segment (this achieves the “weighting:” thus a wall that is 40 feet long would count four times as much as another wall that is only 10 feet long); and
4. Averaging all the weighted segment-grades together to produce the final average grade plane.

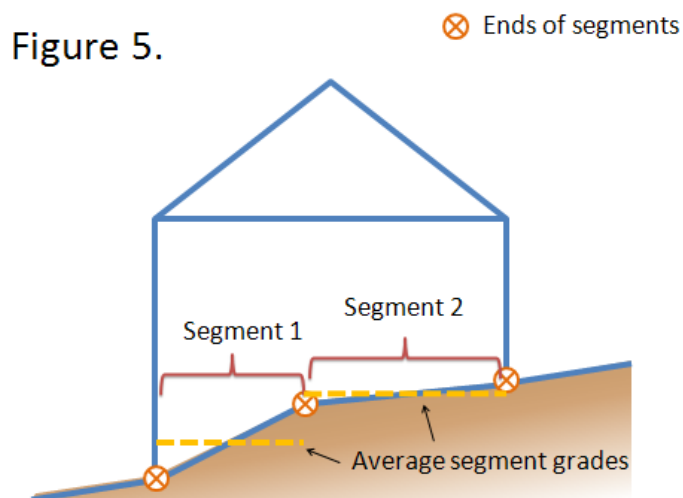


Figure 5 shows one wall can be described by more than one “segment,” each of consistent grade or slope. For each segment, the average grade is calculated by average both ends.

The Planning Department proposes the following new language to replace the existing definition of “grade plane.”

Sec. 30-1 Grade plane: A horizontal reference plane for a building as a whole, passing through the elevation of the finished Average Grade around the perimeter of a building, from which building height is determined.

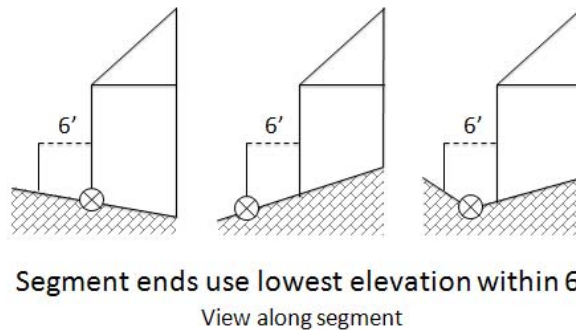
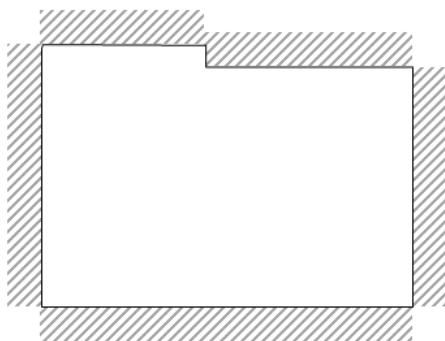
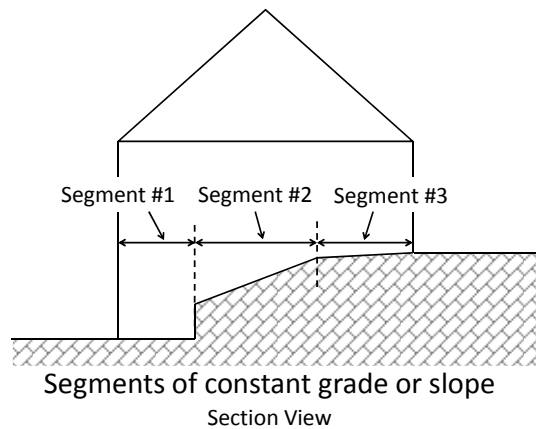
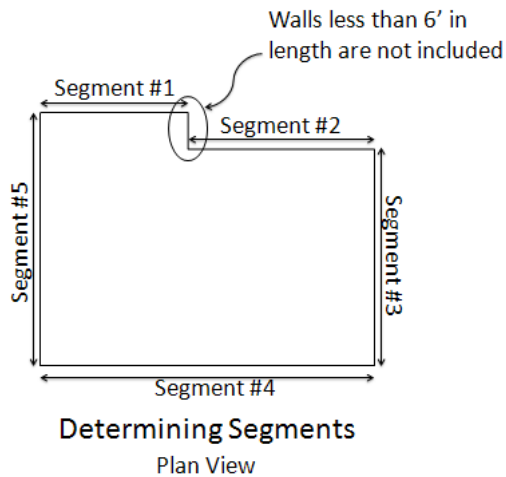
Sect. 30-1 Grade, Average: The average of the grade elevations around the perimeter of a building, as determined by the length-weighted mean formula below. All walls of length greater than six feet shall be included in segments of consistent grade or slope.

$$\frac{\sum[(e1 + e2)/2 \times L]}{P}$$

Where:

- Σ sums the weighted average grades of all segments;
- e1 and e2 are the elevations of the finished ground level at the respective ends of each segment, determined as the lowest point at each end of the segment within six feet of the foundation or the lot line, whichever is closer;
- L is the corresponding horizontal length of the segment; and
- P is total horizontal length of all segments.

The following images would replace those accompanying the existing definition of grade plane:



Explanation

This revised language builds off of the Weston, MA, zoning by-law and adapts it for Newton. It preserves the idea in Newton's current ordinance of taking the lowest point within six feet of the wall in order to prevent berming being used to inflate the grade plane and thus allowed height. It only counts walls of length greater than six feet in order to prevent a developer from artificially inflating grade plane through articulating the high side of a structure, lengthening the total proportion of walls, and increasing their share in the calculation (see Figure 6 below). The proposed definition prevents this problem by only including significant walls (and not ornamental articulation).

Figure 6.

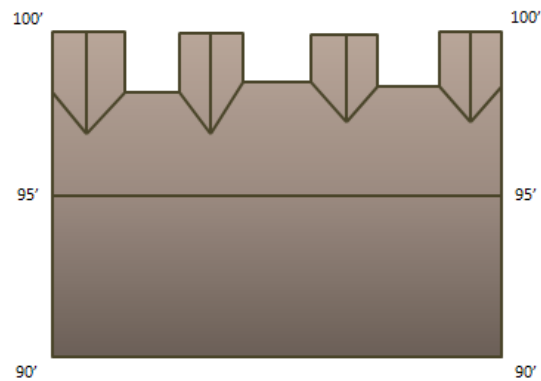


Figure 6 shows articulated “teeth” on the higher elevation wall (top). If each side of each “tooth” were counted as a segment, the wall length would nearly double and would weight the grade plane calculation toward the high end of the slope.

Example Calculation

The following example shows step-by-step how the length-weighted mean grade plane is calculated for a hypothetical house on a sloping lot (see Figures 7-10).

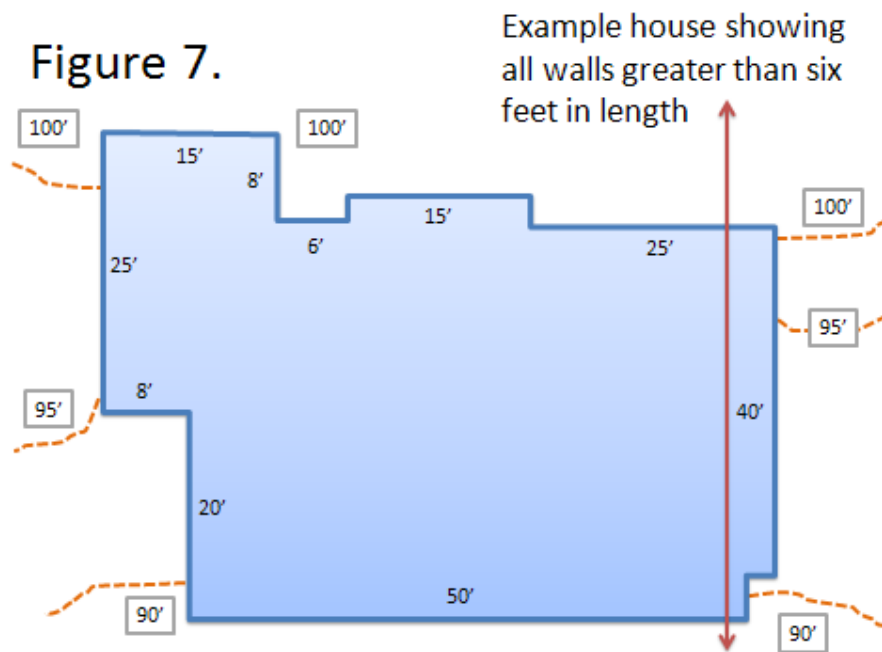


Figure 7 shows a plan view of the example house, with topographic elevations sloping toward the bottom. The red line on the right illustrates the direction of the cross section in Figure 8, below.

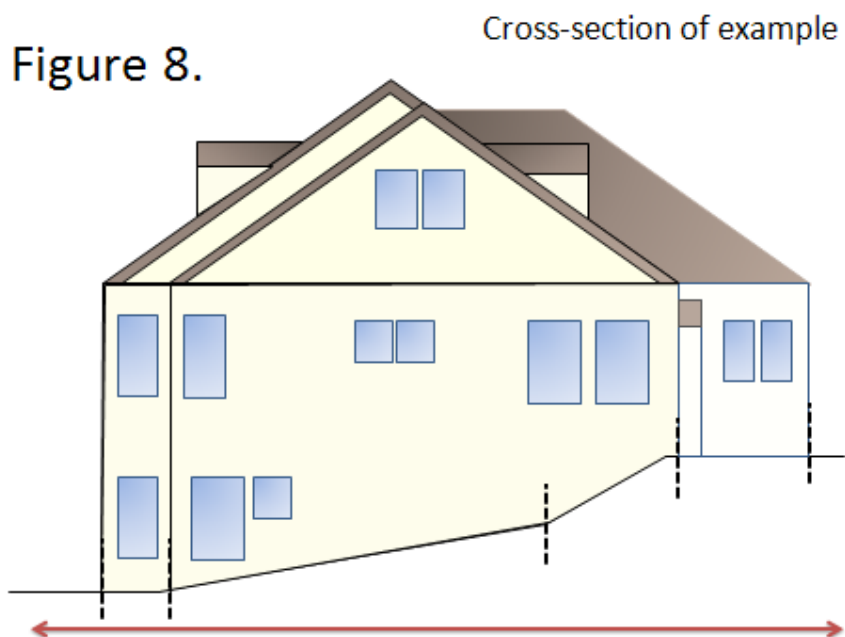


Figure 8 shows a cross section of the house, black dotted lines show divisions between segments of constant grade or slope.

Figure 9.

Segments identified and numbered

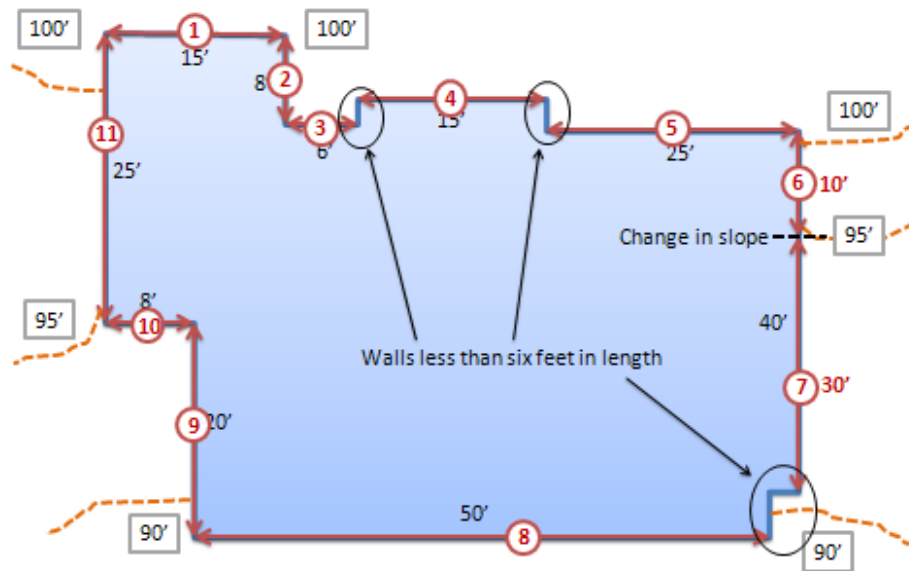


Figure 9 shows the plan view again. Each wall of greater than six feet has been divided into numbered segments (in red) totaling eleven. Walls of less than six feet have been exempted. Segments six and seven occupy the same wall, but represent two segments of differing slopes and are therefore averaged separately (see Figure 8, above).

Figure 10.

Length Weighted
Mean sample
calculation:

$$\frac{\sum[(e1 + e2)/2 \times L]}{P}$$

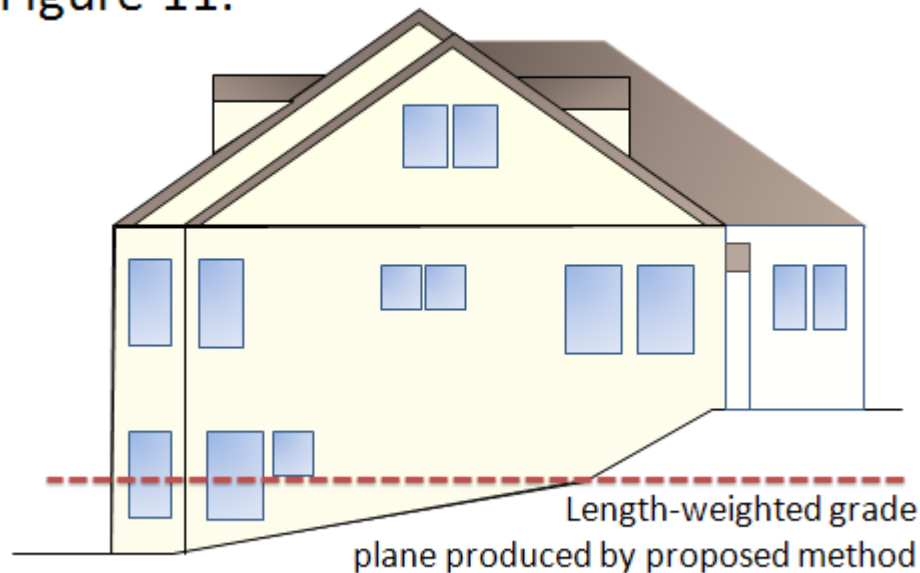


Segment	L	e1	e2	$\frac{e1+e2}{2}$	$\times L$
1	15	100	100	100	1,500
2	8	100	100	100	800
3	6	100	100	100	600
4	15	100	100	100	1,500
5	25	100	100	100	2,500
6	10	100	95	97.5	975
7	30	95	90	92.5	2,775
8	50	90	90	90	4,500
9	20	90	95	92.5	1,850
10	8	95	95	95	760
11	25	95	100	97.5	2,438
Total	212				20,198

Grade Plane under proposed method: $\frac{20,198}{212} = 95.3'$

Figure 10 shows the calculations performed in calculating the length-weighted mean grade of this example structure. Each segment has a length (L). Each segment's two end elevations are averaged to produce an average grade for each segment $((e1+e2)/2)$. Then each segment's average grade is weighted by the length of that segment. Finally, in the bottom line, the total of all these weighted grades is divided by the total length of all the segments to produce a final average mean-grade.

Figure 11.



III. Analysis

The Planning Department's analysis involved the following:

- Examining the general merits and the specific language of the proposed method for calculating grade plane;
- Researching how other communities calculate grade plane, including how the length weighted mean approach has worked for those communities that use the method;
- Considering the impact the change in method might have on building outcomes; and
- Examining the Zoning Ordinance as a whole to identify any potential unintended consequences.

The Inspectional Services and Law Departments worked closely with the Planning Department in its analysis.

Overview

The proposed length-weighted mean method of calculating grade plane achieves a better average grade plane than the current method. By using wall segments in the calculation rather than requiring a single point at the lowest elevation on each side, it is possible to accurately calculate grade plane along walls with varying grades (as in the case of homes with basement garages or sloping lots). Two simple side by side comparisons of the current method and the proposed method have been included in Attachment B.

Comparisons with other communities

The applicants stated in the presentation to the Committee on February 28th that they were drawing upon a common practice in zoning ordinances, notably used by Sudbury and Weston, MA. Staff conducted phone interviews with the inspectors/zoning enforcement officers from both towns to better understand how the length weighted mean approach has worked in their communities. Staff from both communities reported that the method works well; staff from Weston reported that the method is clear and consistent and reduces “gaming” of the system.

The Planning Department also studied the zoning ordinances of neighboring communities. Some municipalities (Needham and Wellesley) do not define a specific calculation for grade plane other than to say that it is the grade adjoining the building. Brookline, Watertown, and Waltham do define a calculation. Brookline’s approach varies depending on the status of adjoining lots and the relative relationship to the street grade. Watertown requires that the grade be averaged from measurements along each wall (30 foot increments) and at each corner. Waltham requires measurements every 20 feet around the perimeter and limits “berming” near structures.

Impact of Proposed Method of Calculating Grade Plane

The Planning Department performed sample calculations using both the existing definition and the proposed approach on three hypothetical representative houses: a house on a flat lot, a house on a lot with a sloping grade from front to rear exposing a walk-out basement, and a house with a basement garage in the front on a largely flat lot.

The analysis found that, on a flat lot, the current and proposed calculations produced the same grade plane calculation. In both the sloping grade and the basement garage examples, the proposed calculation gave grade plane values one to two feet higher than the City’s current calculation (see Appendix A). However, it should be noted that until December 2010, when ISD issued guidance on interpreting the current grade plane definition, inconsistency among engineers and surveyors in use of the grade plane calculations often resulted in higher grade planes than if the rules were applied consistently with ISD’s guidance. Therefore there may be little actual change in building height if the new proposal is adopted. (See Appendix A for an example of how the new grade plane would be calculated.)

ISD and the Planning Department concur that the general method of taking a weighted average of grades surrounding a property is better than the current method laid out in the Zoning Ordinance. It is less easily manipulated and more likely to produce a true average grade. In general the new method may allow for higher grade planes for buildings on sloping lots than the current definition, but as the resulting grade plane is actually an average grade plane, the Planning Department does not see this as a problem.

As noted earlier, grade plane also matters in calculating whether or not a story is considered a basement under the Zoning Ordinance. For one- and two-family residences, a story is a basement if one-half or more of the distance between the floor and ceiling of the floor above lies below the average grade plane; for all other buildings, the story must be two-thirds below the average grade to count as a basement. One possible result of changing the grade plane definition is that, for structures

on sloping lots, it could be slightly easier for a story to count as a basement rather than a first story, because the average grade plane would likely be slightly higher than it would be if calculated under the current definition. If this should happen, the Zoning Ordinance's height regulations still operate to limit overall building height.

Conformity with the Ordinance

As indicated above, the proposed definition change significantly connects to the definitions of "height" and "basement." The Planning Department examined the ordinance for other potential consequences from the proposed change and found none.

IV. Recommendations

Planning and ISD recommend the adoption of the definition as revised in this memorandum. This new length-weighted mean approach has been proven to be effective in other cities and towns. The new approach makes calculations of grade plane more certain, more fair, and less prone to "gaming." Planning and ISD also encourage the Committee to consider petition #65-11 concerning revision of the "height" definition alongside petition #17-11 as both would work together to significantly affect the measurement and regulation of building height in Newton.

Summary of proposed changes:

Delete existing definition of grade plane and replace it with the following:

Sec. 30-1 Grade plane: A horizontal reference plane for a building as a whole, passing through the elevation of the finished Average Grade around the perimeter of a building, from which building height is determined.

Sect. 30-1 Grade, Average: The average of the grade elevations around the perimeter of a building, as determined by the length-weighted mean formula below. All walls of length greater than six feet shall be included in segments of consistent grade or slope.

$$\frac{\Sigma[(e1 + e2)/2 \times L]}{P}$$

Where:

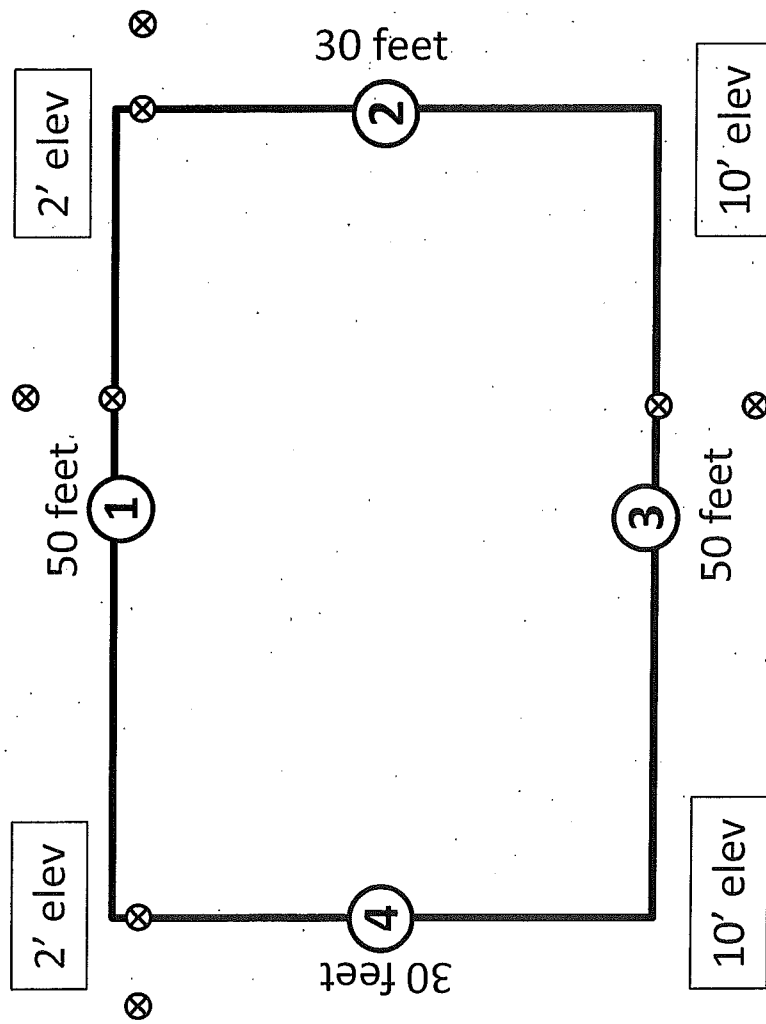
- Σ sums the weighted average grades of all segments;
- e1 and e2 are the elevations of the finished ground level at the respective ends of each segment, determined as the lowest point at each end of the segment within six feet of the foundation or the lot line, whichever is closer;
- L is the corresponding horizontal length of the segment; and
- P is total horizontal length of all segments.

Appendix A:

Examples of Current and Proposed Calculations

Appendix A:

1. Sloping Down



Average Grade under
current method: $\frac{(10 + 2 + 2 + 2) \times 2}{8} = 4.0'$

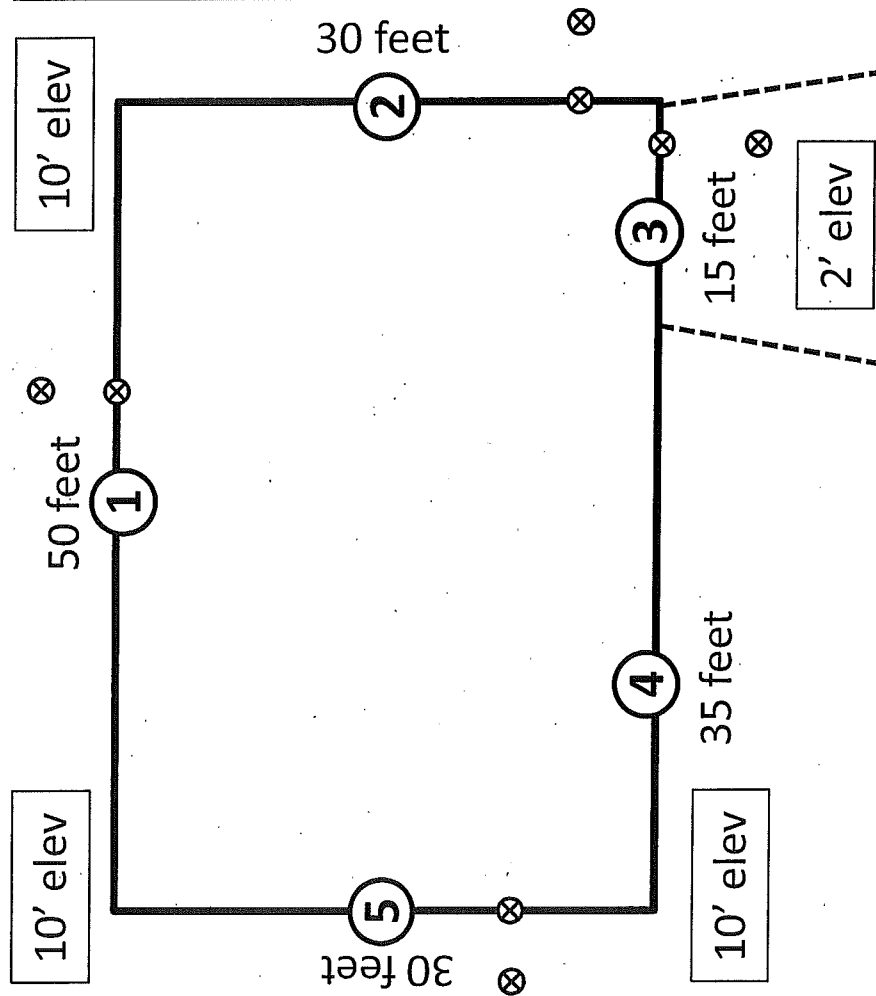
Length Weighted Mean Equation:
$$\frac{\sum[(e1 + e2) / 2 \times L]}{P}$$

	L	e1	e2	$\frac{e1+e2}{2}$	xL
①	50	2.0	2.0	2.0	100
②	30	2.0	10.0	6.0	180
③	50	10.0	10.0	10.0	500
④	30	10.0	2.0	6.0	180
TOTAL	160				960

Average Grade under
proposed method: $\frac{960}{160} = 6.0'$

Appendix A:

2. Garage Under



Length Weighted Mean Equation:

$$\frac{\sum[(e1 + e2) / 2 \times L]}{P}$$

	L	e1	e2	$\frac{e1+e2}{2}$	x L
①	50	10.0	10.0	10.0	500
②	30	10.0	10.0	10.0	300
③	15	2.0	2.0	2.0	30
④	35	10.0	10.0	10.0	350
⑤	30	10.0	10.0	10.0	300
Total	160				1480

Average Grade under
current method: $\frac{(10 + 10 + 10 + 2) \times 2}{8} = 8.0'$

Average Grade under
proposed method: $\frac{1480}{160} = 9.2'$

N24°31'44"E
200.66'

Surveyor's Points, Pre-current Interpretation

123.3
119.0
127.5
129.3
129.8
129.7
129.9
126.3

Avg = 126.9 feet

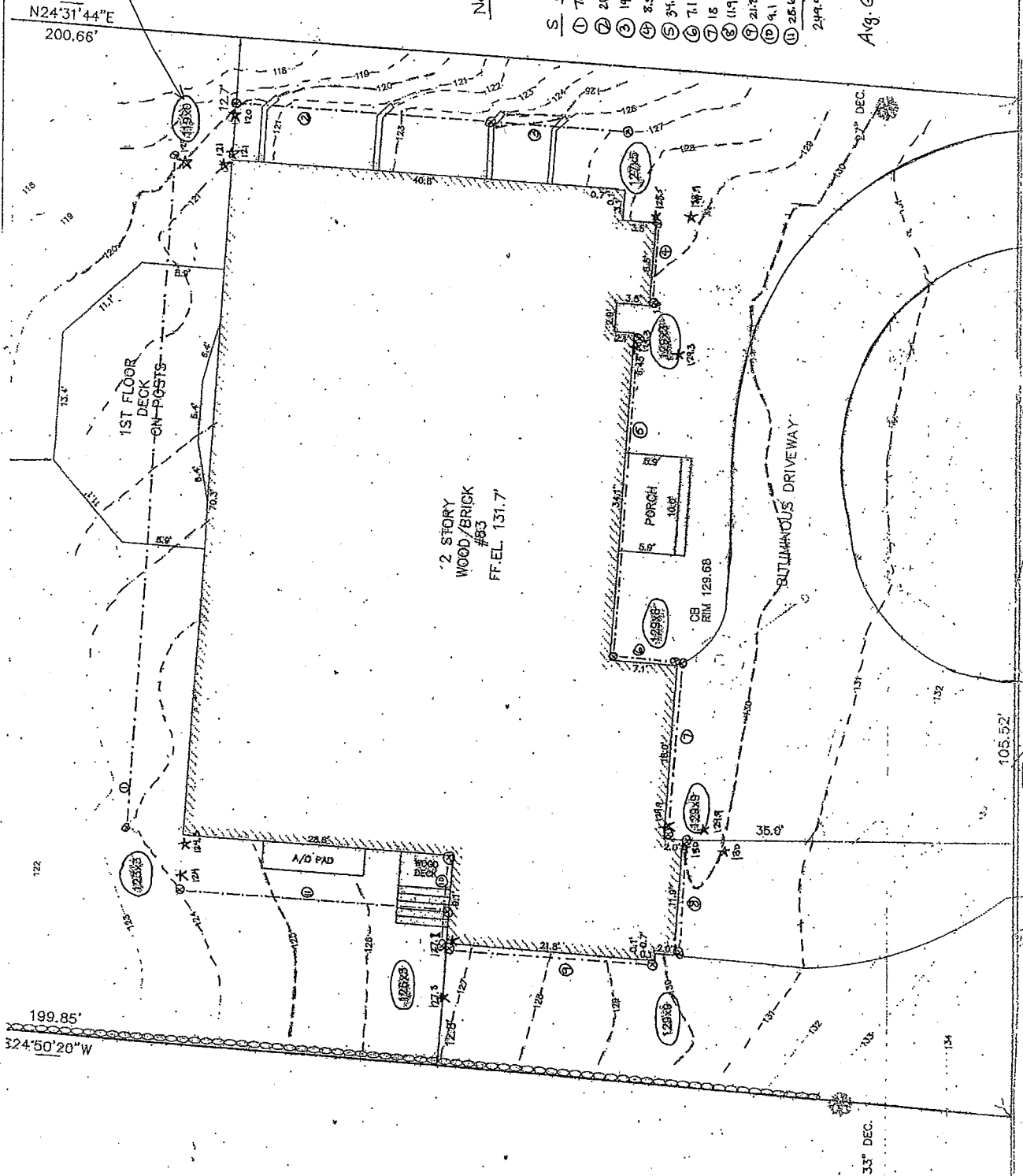
Current Interpretation

$$124 + 124.3 + 120 + 121 + 120 + 121 +$$

New Method:

$$\frac{\Sigma[(e' + e^2)/2 \times L]}{P}$$

S	L	e^1	e^2	$\frac{e_1 + e_2}{2} \times L$
①	70.3	123.7	114.8	121.75
②	26	120	124	122
③	14	124	127	125.5
④	8.5	124.5	124.2	124.85
⑤	34.1	123.3	124.7	124.5
⑥	7.1	124.7	124.3	124.5
⑦	18	124.9	124.9	124.85
⑧	11.9	130	130.1	130.05
⑨	21.3	124.5	124.5	124.5
⑩	9.1	124.5	124.8	124.65
⑪	25.6	124.8	125.4	125.1
	249.4			3400.7
				31377

$$\text{Avg. Grade} = \frac{31,377}{749.4} = 125.8 \text{ feet}$$


Appendix B:

History of Amendments to Grade Plane Definition



CITY OF NEWTON, MASSACHUSETTS

City Hall
1000 Commonwealth Avenue
Newton, Massachusetts 02159
Telephone: (617) 552-7135 Telecopier: (617) 965-6620

DEPARTMENT OF PLANNING AND DEVELOPMENT

Eugene A. Bober, Director

Public Hearing Date: January 27, 1997
ZAP Action Date: March 24, 1997
Board of Alderman Action Date: April 7, 1997
90 Day Expiration: April 28, 1997

1997 JAN 24 PM 5:17
CITY CLERK
NEWTON, MA 02159

TO: Mayor Thomas B. Concannon, Jr.
Board of Alderman
Planning and Development Board

FROM: Carol E. Bock, Acting Director of Planning and Development
Mark A. Johnson, Planner

SUBJECT: Petition #456-96 Alderman Yates proposing amendment to Sec. 30-1 to eliminate the exemption of uninhabitable space from height restrictions.

RECOMMENDATION: APPROVE REVISED DEFINITION OF BUILDING HEIGHT - SECTION 30-1

I. ELEMENTS OF THE PETITION

This amendment would eliminate wording in the building height definition which allows pitched roofs to exceed height restrictions. The request for this amendment is part of an effort to limit the height and mass of new buildings which are often out of character with existing neighborhoods.

II. BACKGROUND

All around Newton and surrounding communities, homes are being razed to make way for larger modern structures. Developers are building the largest homes zoning regulations will allow to take advantage of the continuing rise in property values (see attached graph). An amendment to the language in the building height definition (as well as revisions to floor area ratio and open space requirements) would reduce the potential mass of new buildings and make it less profitable to demolish existing structures.

Several examples of homes recently or soon to be demolished for new construction include:

- 19 Troy Lane where a one-story bungalow was demolished
- 18 Fuller Street where a 2-1/2 story gable front late 19th Century home was demolished
- Highland Street where a 1840's house was demolished
- 116 Vine Street where a worker's cottage was demolished
- 9 Cedar Street where a house, barn and jam factory will be demolished
- 372 Central Street where a large late 19th Century house was demolished
- 97 Forest Avenue where a Queen Anne demolition was delayed by Historic Commission.
- 69 Webster Park seeks permission to demolish a 2-1/2 story gable front Italianate house.
- 11 Anita Circle where a historic cottage was demolished.
- 3 Gardner Street where a 2 story gable front was demolished
- 20 Richardson Street demolition delayed by Historic Commission.

Half of these demolitions were delayed by the Historical Commission in an effort to save the buildings. Clearly, our historic resources are in jeopardy, as is the character of our neighborhoods.

III. ANALYSIS

A. Current Definition

The current City height restriction in all residential districts is 36 feet. This is consistent with most of our surrounding communities. However what is not consistent is Newton's method of measuring building height. While most communities use the "top of the structure" to measure height, Newton uses the ceiling joists of the upper most habitable space. Any slope above the ceiling is not included in the measurement or the restriction:

Height: The distance from the mean grade to the top of the highest roof beams of a building with a flat roof, to the top of a structure, or, *in the case of a building with a pitched roof, to the top of the ceiling joists of the topmost habitable space*, or, where there is no ceiling, to the top of the roof rafters (except that where the topmost habitable space in a pitched roof building has no ceiling, height shall be measured from the roof plate line if the floor of such habitable space is not less than six (6) feet below the roof plate line), provided that:

- (a) cornices do not extend more than five (5) feet above the highest point of the roof;
- (b) chimneys, ventilators, enclosures for machinery of elevators and other projections required above the roof do not exceed fifteen (15) feet in height,
- (c) enclosures for tanks do not exceed twenty (20) feet in height above the roof beams and do not in total area exceed ten percent (10%) of the area of the roof,

- (d) towers, spires, domes, and ornamental features, shall not be included in such measurement. Further, no space above the maximum height established in Section 30-15, Table I, shall be habitable.

By this definition an unhabitable attic, one in which the ceiling area at a height of 7-1/3 feet above the attic floor is less than 1/3 the area of the floor next below, would not be included in the height measurement. All of the pitched roof extending above the ceiling of the uppermost floor could legally exceed 36 feet. Attached find a sketch that demonstrates the scale of legal residential development in Newton.

B. Exemptions

Exemptions to the height restriction are mainly for commercial structures. These include machinery rooms for elevators and tank enclosures which do not exceed ten percent of the area of the roof. Towers, spires, domes, and ornamental features are exempt for use on religious and governmental buildings; however, they are also exempt for residences. Some architectural styles may feature a platform or tower on top of a home, as does the Queen Anne style. To prevent these exemptions from being abused, the definition states that no space above the maximum height may be habitable.

IV. PROPOSED REVISED DEFINITION

Replace Height definition Section 30-1 with:

Height: The height of a building is the vertical distance of the highest point of the roofline above the mean grade of the property. Not included in such measurement are cornices which do not extend more than five feet above the roofline; chimneys, ventilators and enclosures for machinery of elevators which do not exceed fifteen (15) feet in height above the roofline; enclosures for tanks which do not exceed twenty (20) feet in height above the roofline and do not exceed in united area ten (10) percent of the area of the roof; towers, spires, domes, and ornamental features. Further, no space above the maximum height established in section 30-15, Table I, shall be habitable.

While this language change would ultimately reduce the height of buildings, it may also have other consequences. The zoning code currently allows buildings with three stories in residential districts. In an effort to squeeze in three stories of living space, more new homes could be constructed with flat roofs or roofs with lower slopes. Obviously, flat-roofed structures would not be architecturally compatible with most neighborhoods. The Board may wish an additional change to the zoning code to allow only two or 2-1/2 stories instead of three.

V. CONCLUSION AND RECOMMENDATION

The proposed language change would allow only specific exemptions to the building height restriction. These exemptions would be limited to decorative features and mechanical areas -- spaces that are not habitable. The problem that exists is that height above the ceiling of the uppermost floor may be exempt when determining overall building height. The proposed language change, combined with a reduction in the permitted number of stories, would be an effective means of reducing the size of newly constructed homes.

The Planning Department, therefore, recommends approval of this amendment with the proposed language.

HEIGHT DEFINITIONS OF SURROUNDING COMMUNITIES

Maximum height restriction in the Town of Needham:

Height is determined by the vertical distance of the highest point of a structure, or the roof of a building, above the average grade of the ground adjoining the building or surrounding the structure.

Maximum height in all districts is thirty-five (35) feet and 2-1/2 stories.

There is an exemption for towers, steeples, spires or domes of religious or government buildings. Also, schools and municipal buildings may contain three stories and be as high as 40 feet. Separate regulations exist for communication antennas and towers.

Maximum height restriction in the Town of Arlington:

Height is determined by the vertical distance of the highest point of the roof above the average finished grade of the ground adjoining the building. The definition excludes penthouses, bulkheads, and other allowable superstructures above the roof line.

Exceptions to maximum height limitations are chimneys, ventilators, skylights, water tanks, bulkheads, penthouses and other accessory additions which are customarily carried above the roofs of buildings nor to towers, spires, domes, cupolas, and similar additions to buildings if such additions are not used for living purposes, and if such structures occupy not more than twenty percent (20%) of the ground floor of the building.

Maximum height regulations for the Town of Westwood:

Height is determined by the highest finished elevation of the ground adjoining the structure to the highest point of the roof line. The limitations on height shall not apply to chimneys, ventilators, skylights, tanks, bulkheads, penthouses, and other necessary features usually carried above the roofline, provided such features do not cover more than twenty-five percent (25%) of the roof of the building or other structure and are used in no way for human occupancy.

Maximum height regulations for the City of Watertown:

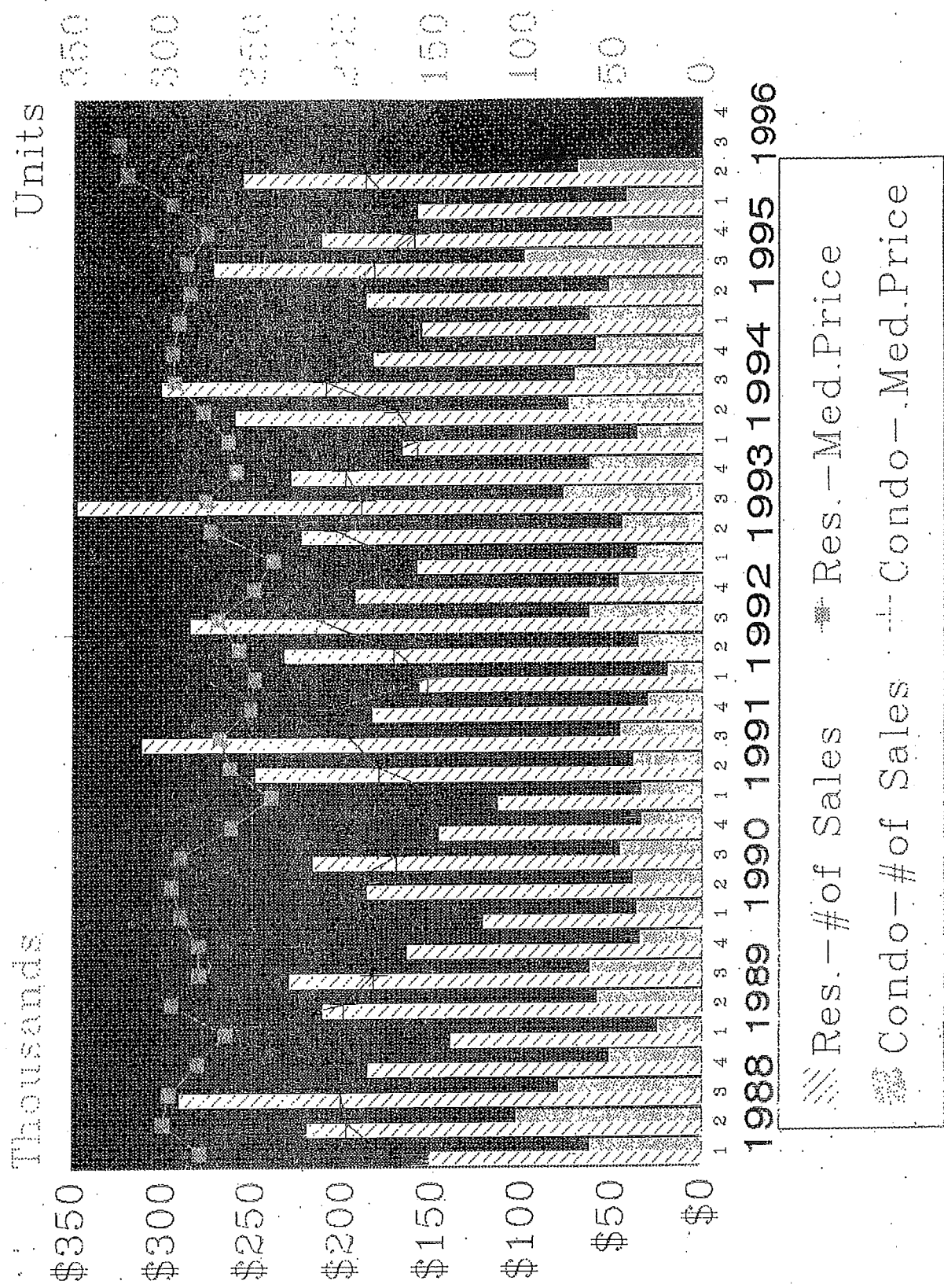
The vertical distance of the highest point of the structure above the average existing grade along the front building line. The limitation of height shall not apply features that are not used for living purposes provided they do not exceed the maximum height by fifteen (15) feet.

Maximum height regulations for the City of Gloucester:

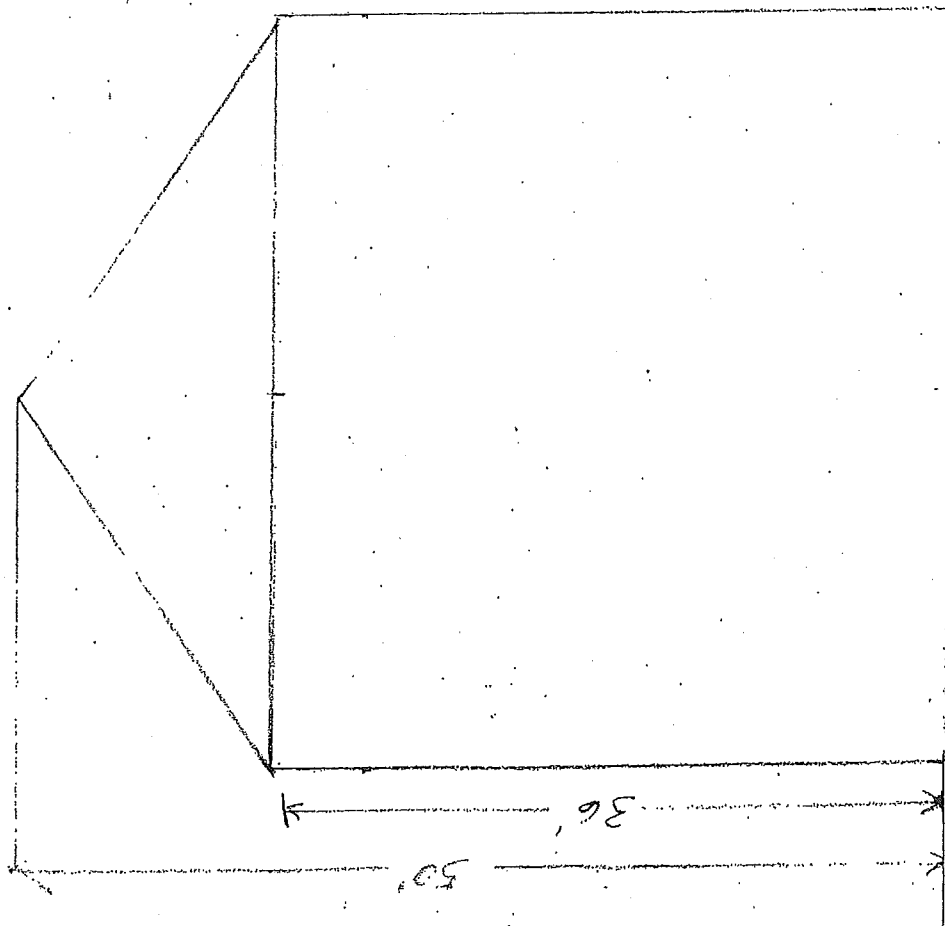
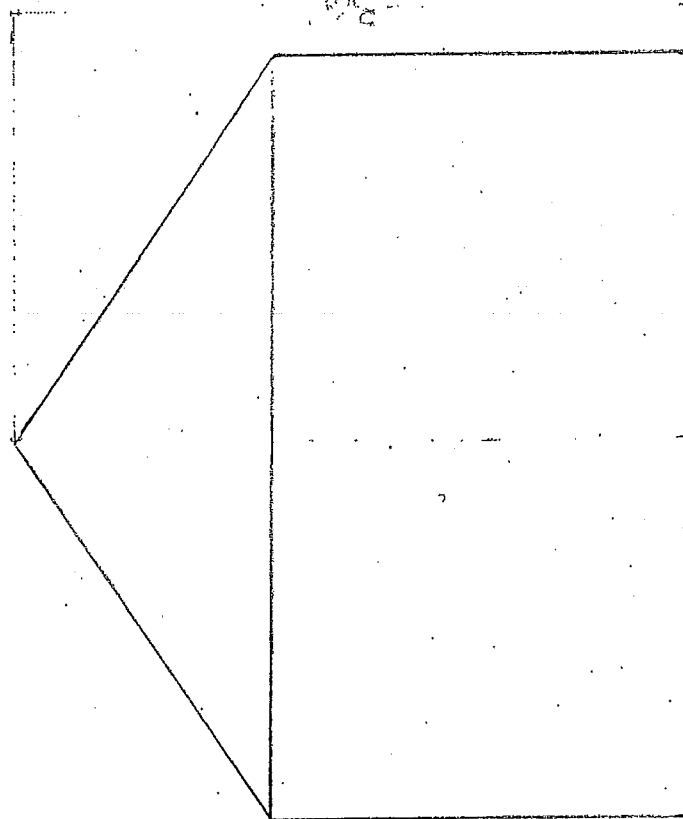
The vertical distance measured from the average grade prior to building construction to the highest point of the roof assembly including parapets in the case of a flat roof, or to the highest point of the peak or ridge in the case of a peak or sloping roof. Not included are spires, cupolas, antennae, or other parts of structures which do not enclose habitable floor space.

SALES AND MEDIAN PRICES FOR RESIDENTIAL PROPERTY IN NEWTON

BY QUARTER, 1988 to 1996



Source: BANKER & TRADESMAN



CITY OF NEWTON

IN BOARD OF ALDERMEN

April 23, 1997

ORDINANCE NO. V-111

BE IT ORDAINED BY THE BOARD OF ALDERMEN OF THE CITY OF NEWTON AS FOLLOWS:

That the Zoning regulations, Chapter 30 of the Revised Ordinances of the City of Newton, Mass. 1995, as amended, be and are hereby further amended as follows:

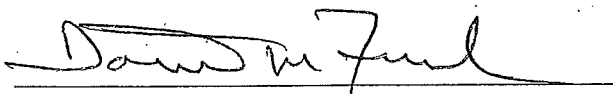
1. Substitute for the existing height definition in Section 30-1 the following:

Height. The vertical distance from grade plane to the average height of the highest roof surface. Not included in such measurements are 1) cornices which do not extend more than five feet above the roof line; 2) chimneys, vents, ventilators and enclosures for machinery of elevators which do not exceed fifteen (15) feet in height above the roof line; 3) enclosures for tanks which do not exceed twenty (20) feet in height above the roof line and do not exceed in aggregate area ten (10) per cent of the area of the roof; and 4) towers, spires, domes and ornamental features. Further, no space above the maximum height established in Section 30-15, Table 1, shall be habitable.

2. Amend the building height limitation in Section 30-15, Table 1 to 30 feet.
3. Add a definition of *Grade plane* to Section 30-1.

Grade plane: A reference plane representing the average of finished ground level adjoining the building at all exterior walls.

Approved as to legal form and character




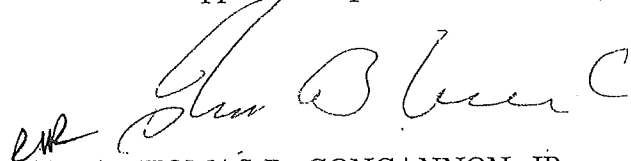
Daniel M. Funk
City Solicitor

Under Suspension of Rules
Readings Waived and Adopted
19 yeas 1 nay (Ald. Salvucci)
3 absent (Ald. Antonellis, Ciccone, Lipsitt)
1 vacancy

EXECUTIVE DEPARTMENT

Approved April 25, 1997


(SGD) EDWARD G. ENGLISH
City Clerk


(SGD) THOMAS B. CONCANNON, JR.
Mayor 4/30/97

RECEIVED

APR 25 1997

MAYORS OFFICE



David B. Cohen
Mayor

City of Newton, Massachusetts
Department of Planning and Development
Michael J. Kruse, Director

78.99
79.99
80.99
81.99
82.99
83.99
84.99

Telephone
(617) 552-7135
Telefax
(617) 552-6622
E-mail
mkruse@newton.ma.us

Public Hearing Date: March 22, 1999
ZAP Action Date: May 24, 1999
Board of Aldermen Action Date: June 7, 1999
90-Day Expiration Date: June 21, 1999

1999 MAR 19 PM 4:22
CITY CLERK
NEWTON, MA 02459

TO: Mayor David B. Cohen
Board of Aldermen
Planning and Development Board

FROM: Michael Kruse, Director of Planning and Development
Susan Glazer, Director of Current Planning

SUBJECT: Petitions of the Zoning and Planning Committee to amend the Zoning Ordinance:
#78-99 pertaining to the definition of "height"; #79-99 pertaining to the definition of
"grade plane"; #80-99 pertaining to the definition of "basement"; #81-99 pertaining
to the definition of "attic"; #82-99 pertaining to Section 30-15, Table 1, Footnote 8;
#83-99 pertaining to the height in feet of certain types of residential structures in
Section 30-15, Table 1; and #84-99 changing the term "more than two dwelling on a
lot" to "multi-family dwelling"

The purpose of this memorandum is to provide the Mayor, Board of Aldermen, the Planning and Development Board and the public with technical information and planning analysis which may be useful in the decision making process of the Board of Aldermen. The Planning Department's intention is to provide a balanced view of the issues with the information it has at the time of the public hearing. There may be other information presented at or after the public hearing which the Zoning and Planning Committee of the Board of Aldermen will want to consider in its discussion at a subsequent Working Session.

ELEMENTS OF THE PETITION

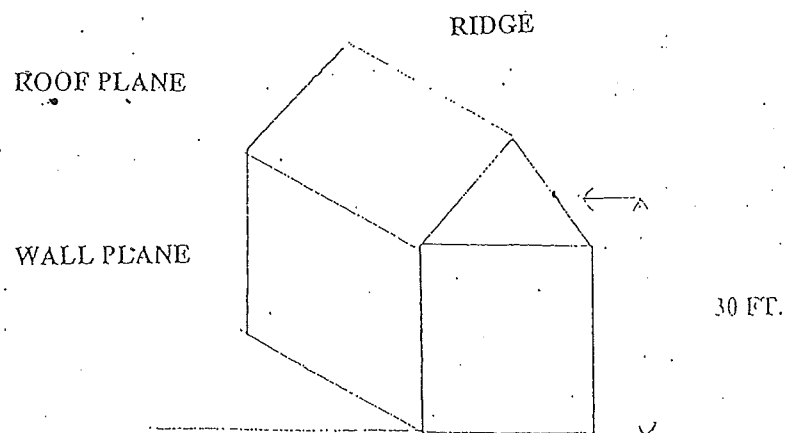
This set of proposed amendments is intended to clarify terms frequently used to determine the height of a building. Concerns have been raised in the past about the lack of clarity so that not only the proponent of a development, but also the public, can understand how height is measured. The issues of height, grade plane, basement, etc. are all interrelated. For that reason, we will discuss these issues as a package, rather than individually. We have also included diagrams for further clarification of concepts. A summary of the proposed text changes is included at the end of this report.

HEIGHT

The definition of height was amended by Ordinance V-111. It provided for the measurement of building height to the midpoint of the highest roof surface. See illustration below. This was done to encourage peaked, rather than flat, roofs. The ZAP Committee wanted a clearer definition of height using easily identifiable architectural terms. Thus, we have used the terms "wall plane" and "roof plane" to identify the bottom line of the roof and the ridge (top) of the roof to describe the topmost point of measurement. It is the midpoint of these two measurements from the grade plan (See below) that would determine the height. The words in bold show the proposed language.

Revise the definition of height in Section 30-1:

The vertical distance between the elevations of the following: (a) the grade plane and (b) the midpoint between the highest point of the ridge of the roof and the line formed by the intersection of the wall plane and the roof plane. Not included in such measurement are 1) cornices which do not extend more than five (5) feet above the roof line; 2) chimneys, vents, ventilators and enclosures for machinery of elevators which do not exceed fifteen (15) feet in height above the roof line; 3) enclosures for tanks which do not exceed twenty (20) feet in height above the roof line and do not exceed in aggregate area ten (10) per cent of the area of the roof; and 4) towers, spires, domes and ornamental features. Further, no space above the maximum height established in Section 30-15, Table 1, shall be habitable.



GRADE PLANE

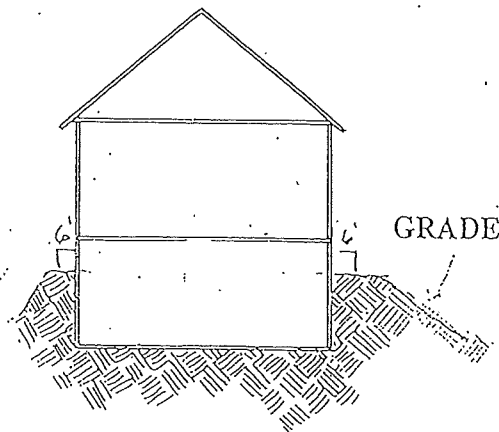
The definition of grade has changed several times over the years. Most recently, ordinance V-111 added a definition of *grade plane*. Grade plane is defined as

A reference plane representing the average of finished ground level adjoining the building at all exterior walls.

Under the current definition, measurements are made where the foundation of a structure meets the grade. This allows a person to mound earth near the foundation in order to meet the height requirements. It also requires that light wells and stairwells must be counted in the calculation. The State Building Code defines grade plane as a measurement taken from the lowest point within the area 6 ft. from the structure. This would allow stairwells and light wells to be discounted in the measurement and prevents mounding. However, in order to comply with this definition, one might use more low retaining walls to mound the earth. See illustrations below. We recommend that the definition of grade plan be changed as follows:

Revise the definition of grade plane in Section 30-1:

A reference plane representing the average of finished ground level adjoining the building or structure at all exterior walls. The reference plane shall be calculated by using the lowest points of elevation of finished ground level within the area between a reference plane for a building or structure as a whole representing the average of finished ground level adjoining the building or structure at all exterior walls. The elevation of each point used to calculate said average shall be determined by using the lowest points of elevation of finished ground level within the area immediately adjoining the building or structure and either the lot line or a point six (6) feet from the building or structure, whichever is closer to the building or structure.



BASEMENT

The existing definition of basement reads as follows:

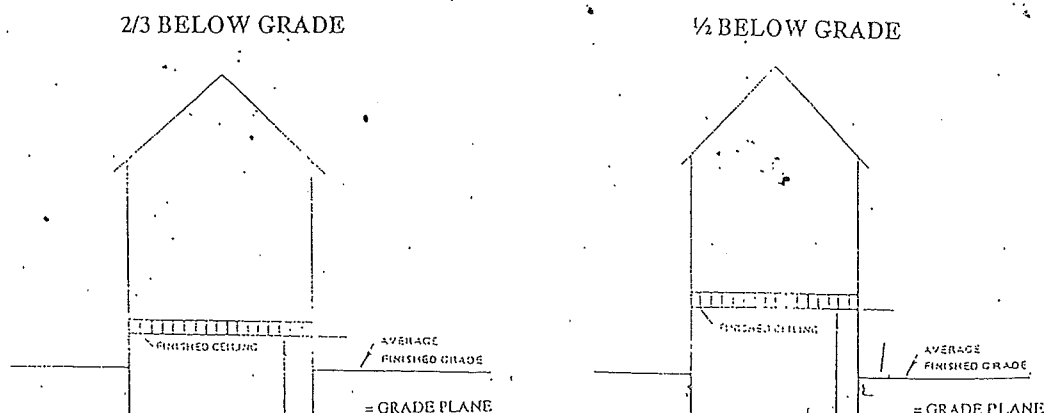
Any story in a building in which two-thirds (2/3) or more of the distance between the floor and the roof next above it is below the average grade elevation immediately adjacent to said building.

The two-thirds requirement results in many "near-basements", particularly on sloped lots. Initially we recommended changing 2/3 to 1/2. However, after further thought, we recommend that the current definition remain for new construction. The unintended result of such a change could be higher buildings with more visible bulk of the building. We do, however, recommend that the word "roof" be replaced with "ceiling" for clarity.

One of the resultant problems with Ordinance V-111 has been that for small additions on the back of existing 2 or 2 1/2 story buildings on sloped land special permits are needed because the basement counts as a story, and the building then exceeds the allowed maximum of 2 1/2 stories. For some petitioners of small residential additions, this has been a time-consuming burden. Therefore, we recommend two definitions: one for existing structures and one for new structures, essentially to grandfather existing structures. The Inspectional Services Department feels that this would be too confusing and will make the Zoning Ordinance less user friendly. However, creating a dichotomy between "old" and "new" houses already exists for Floor Area Ratio. The Inspectional Services Department feels that a distinction can be made because FAR applies to existing houses in limited circumstances, but that it will always apply to structures built after 1997.

Revise the definition of basement in Section 30-1:

Any story in a building which has had a building permit or special permit issued therefor after May 1, 1999 in which two-thirds (2/3) or more of the distance between the floor and the ceiling next above it is below the average grade elevation immediately adjacent to the building, or any story in a building which has had a building permit or special permit issued therefor on or before May 1, 1999 in which one half (1/2) or more of the distance between the floor and the ceiling next above it is below the average grade elevation immediately adjacent to the building.



ATTIC

The definition of *attic* was added by Ordinance V-122. It reads:

The space in a building between the ceiling beams of the top story and the roof rafters

To further clarify this definition we recommend that the words "ceiling beams" be replaced with the word "joists" which is technically more accurate, and that the word "full" be added to read:

The space in a building between the ceiling joists of the top full story and the roof rafters.

FOOTNOTE #8

The space above a half-story was not intended to be habitable. Therefore, we recommend that Section 30-15, Table 1, should be amended to add a superscript 8 to the column headed by BLDG. HEIGHT and add a Footnote #8 as follows:

In Section 30-15, Table 1, add a superscript 8 to the column headed by BLDG. HEIGHT and add a Footnote #8 as follows:

⁸ *No space above the maximum height established in Table 1 shall be habitable.*

NUMBER OF STORIES

When the Zoning Ordinance was printed in July 1997 following the passage of Ordinances V-111, V-112 and V-122, Table 1 was revised. However, the column for Bldg. Height in Table 1 was changed to read 30 ft. in all cases. Based on the discussions that lead up to Ordinance V-111, the aldermen intended the 2 1/2 story, 30 ft. height limitation to apply to single and two-family structures and structures which resembled single and two-family homes. These would include attached dwellings and single family detached developments. Thus, we recommend the following changes:

In Multi-Residence 2 Districts, for More than Two Dwellings on a Lot and for Garden Apartments (30-9(d)), strike out the number "30" and, in each case, replace it with "36" in each case.

In Multi-Residence 3 Districts, for More than Two Dwellings on a Lot and for Residential Care Facility (30-9(e)), strike out the number "30" and, in each case, replace it with "60" in each case.

In Multi-Residence 4 Districts, for More than Two Dwellings on a Lot, strike out the number "30" and, in each case, replace it with "--".

In Multi-Residence 4 Districts, for Residential Care Facility, strike out the number "30" and replace it with "60".

MULTI-FAMILY DWELLINGS

One of the issues that arose with the review of above matter was the inconsistency between the term "More than Two Dwellings on a Lot" and "Multi-Family Dwelling". The term "More than Two Dwelling on a Lot" is used only in Table 1 of Section 30-15 although it has historically been interpreted to be multi-family housing. The ordinance does not define the term. "Multi-Family Dwelling", on the other hand, is defined as "A building or structure containing three (3) or more dwelling units." It is an understandable definition. Therefore, we recommend that "Multi-Family Dwelling" replace the term "More than Two Dwellings on a Lot" wherever it appears in the Zoning Ordinance.

EXISTING AND PROPOSED ORDINANCE LANGUAGE

	Existing	Proposed
HEIGHT	<p><i>The vertical distance from the grade plane to the average height of the highest roof surface. Not included in such measurement are 1) cornices which do not extend more than five (5) feet above the roof line; 2) chimneys, vents, ventilators and enclosures for machinery of elevators which do not exceed fifteen (15) feet in height above the roof line; 3) enclosures for tanks which do not exceed twenty (20) feet in height above the roof line and do not exceed in aggregate area ten (10) per cent of the area of the roof; and 4) towers, spires, domes and ornamental features. Further, no space above the maximum height established in Section 30-15, Table 1, shall be habitable.</i></p>	<p><i>The vertical distance from the grade plane to the midpoint between the intersection of the wall plane with the roof plane and the highest point of the ridge of the roof. Not included in such measurement are 1) cornices which do not extend more than five (5) feet above the roof line; 2) chimneys, vents, ventilators and enclosures for machinery of elevators which do not exceed fifteen (15) feet in height above the roof line; 3) enclosures for tanks which do not exceed twenty (20) feet in height above the roof line and do not exceed in aggregate area ten (10) per cent of the area of the roof; and 4) towers, spires, domes and ornamental features. Further, no space above the maximum height established in Section 30-15, Table 1, shall be habitable.</i></p>
GRADE PLANE	<p><i>A reference plane representing the average of finished ground level adjoining the building at all exterior walls.</i></p>	<p><i>A reference plane for a building or structure as a whole representing the average of finished ground level adjoining the building or structure at all exterior walls. The elevation of each point used to calculate said average shall be determined by using the lowest points of elevation of finished ground level within the area between a point immediately adjoining the building or structure and either the lot line or a point six feet from the building or structure, whichever is closer to the building or structure.</i></p>

BASEMENT	<i>Any story in a building in which two-thirds (2/3) or more of the distance between the floor and the roof next above it is below the average grade elevation immediately adjacent to the building.</i>	<i>Any story in a building which has had a building permit or special permit issued therefor after May 1, 1999 in which two-thirds (2/3) or more of the distance between the floor and the ceiling next above it is below the average grade elevation immediately adjacent to the building, or any story in a building which has had a building permit or special permit issued therefor on or before May 1, 1999 in which one half (1/2) or more of the distance between the floor and the ceiling next above it is below the average grade elevation immediately adjacent to the building.</i>
ATTIC	<i>The space in a building between the ceiling beams of the top story and the roof rafters</i>	<i>The space in a building between the ceiling joists of the top full story and the roof rafters.</i>
FOOTNOTE #8	<i>⁸ No space above the maximum height established in Table 1 shall be habitable</i>	Same language, but relocated to Section 30-15, Table 1, Footnote #8
HEIGHT IN FEET	<p>In Multi-Residence 2 Districts for More than Two Dwellings on a Lot and Garden Apartments (30-9(d)) - 30</p> <p>In Multi-Residence 3 Districts for More than Two Dwellings on a Lot and for Residential Care Facility (30-9(e)) - 30</p> <p>In Multi-Residence 4 Districts for More than Two Dwellings on a Lot - 30</p> <p>In Multi-Residence 4 Districts for Residential Care Facility - 30</p>	<p>In Multi-Residence 2 Districts, for More than Two Dwellings on a Lot and for Garden Apartments (30-9(d)) - 36</p> <p>In Multi-Residence 3 Districts, for More than Two Dwellings on a Lot and for Residential Care Facility (30-9(e)) - 60</p> <p>In Multi-Residence 4 Districts, for More than Two Dwellings on a Lot "..."</p> <p>In Multi-Residence 4 Districts, for Residential Care Facility - 60</p>
	More than two dwellings on a lot	Multi-family dwelling

CITY OF NEWTON

IN BOARD OF ALDERMEN

ZONING AND PLANNING COMMITTEE REPORT

MONDAY, MAY 24, 1999

Present: Ald. Yates (Chairman), Ald. Baker, Merrill, M. Lipof, and Bullwinkle

Absent: Ald. Maguire, Mansfield and Sangiolo

Also present: Ald. Parker

City officials: Michael Baseman (Assistant City Solicitor), Joseph Latronica (Commissioner of Inspectional Services), Lou Mercuri (Senior Planner)

79-99 ZONING & PLANNING COMMITTEE, proposing that the definition of "grade plane" in Sec. 30-1 be amended as follows: Grade plane. A reference plane representing the average of finished ground level. The average shall be calculated by using the lowest elevation of finished ground level within the area between the point immediately adjoining the building or structure and either the lot line or a point six (6) feet from the building or structure, whichever is closer to the building or structure.

ACTION: APPROVED AS AMENDED 5-0

NOTE: This item was heard on March 22 and held for more information. It was an outgrowth of the several items filed in the wake of the Andover-Newton special permit petition. The initial discussion focused on ways to avoid mounding, i.e., the raising of land around the foundation of a house to avoid the height limitation. The six-foot provision would avoid this. Ald. Parker raised questions about the ways averages would be taken, but the committee was satisfied with the proposed language. Ald. Parker also raised other issues concerning the development of sloped lots, but the committee agreed that these should be dealt with through other items. The committee then voted to approve the item with the inclusion of diagrams necessary to make it clearly understandable.

ITEM RECOMMITTED BY FULL BOARD APRIL 5:

21-99 LAND USE COMMITTEE proposing that Sec. 30-8(d) and 30-9(h) be amended so that in petitions requiring a special permit for an accessory apartment no prospective additions or exterior alterations shall be allowed for the purpose of satisfying the habitable space requirements. (APPROVED 5-0 ON 3/22.)

ACTION: APPROVED AS AMENDED 5-0

NOTE: Ald. Parker raised the issue of the broadening of the by-right accessory apartment provisions at the same time the special permit provisions were being limited. The committee agreed that only the issue as docketed by the Land Use Committee should be discussed. Ald. Baker

ZONING AND PLANNING COMMITTEE REPORT

MAY 24, 1999

Page 2

explained that the intention was to clearly prohibit the construction of whole new units outside existing buildings, which had been the intent of the Subcommittee which drafted the ordinance. The testimony of Cooperative Living of Newton's Board members pointed out that too strict language would eliminate currently allowable accessory apartments that did not appear to have any detrimental effects. Therefore, he and Ald. Lipsitt had worked with the Law Department to develop a draft that allowed for small additions. The draft had blanks for the square footage, percentage of the total square footage of the accessory apartment and the number of years for which further changes would be prohibited. Ald. Parker pointed out that the language of the draft was ambiguous. After some discussion, it was agreed to clarify the language and adopt 200 square feet (the de minimis limit from elsewhere in the ordinance), 25% (which would allow most of the examples cited by CLN) and two years.

The item was approved with these amendments. All other items were held without discussion.

Respectfully submitted,

Ald. Brian Yates, Chairman

CITY OF NEWTON

IN BOARD OF ALDERMEN

June 7, 1999

ORDINANCE NO. V-247

BE IT ORDAINED BY THE BOARD OF ALDERMEN OF THE CITY OF NEWTON AS FOLLOWS:

That the Zoning regulations, Chapter 30 of the Revised Ordinances of the City of Newton, Mass. 1995, be and are hereby further amended as follows:

1. Delete the existing definition of grade plane in section 30-1 and substitute the following language therefor:

Grade plane:

A reference plane for a building or structure as a whole representing the average of finished ground level adjoining the building or structure at all exterior walls. In calculating said reference plane, the elevation of each point used to calculate said average shall be determined by using the lowest elevation of finished ground level within the area immediately adjoining the building or structure and either the lot line or a point six (6) feet from the building or structure, whichever is closer to the building or structure, as illustrated in the diagrams below.

Approved as to legal form and character

Daniel M. Funk
City Solicitor

Under Suspension of Rules
Readings Waived and Adopted
23 yeas 0 nays 3 absent (Ald. Antonellis, Gentile, M. Lipof)

EXECUTIVE DEPARTMENT
Approved June 9, 1999

(SGD) EDWARD G. ENGLISH
City Clerk

(SGD) DAVID B. COHEN
Mayor

CITY OF NEWTON

IN BOARD OF ALDERMEN

ORDINANCE NO. Z-20

April 7, 2008

BE IT ORDAINED BY THE BOARD OF ALDERMEN OF THE CITY OF NEWTON
AS FOLLOWS:

That the Revised Ordinances of Newton, Massachusetts, 2007, as amended, be and are
hereby further amended with respect to Chapter 30, Zoning as follows:

1. By deleting from Section 30-1 **Definitions**, "*Story, half*", the height designation figure 7'3", and inserting in its place the figure 7'.

2. By adding to Section 30-1 **Definitions** the following new definition:

Dormer: A projection built out from a sloping roof, usually containing a window or vent.

3. By deleting, in Section 30-1 **Definitions**, the first sentence of the definition of *Height*, and inserting in its place the following language:

Height: The vertical distance between the elevations of the following:

(a) the average grade plane and (b) the midpoint between the highest point of the ridge of the main building roof and the line formed by the intersection of the top of the main building wall plate and the main roof plane.

4. By adding to Section 30-15 **Density/dimensional requirements** the following new subsection (t):

30-15(t) **Dormers.** Except as may be allowed by special permit in accordance with Section 30-24, the following restrictions shall apply to dormers above the second story in single and two family dwellings. Dormers are not allowed in accessory structures except by special permit.

- a. A dormer may be no wider than fifty percent (50%) of the length of the exterior wall of the story next below. Where more than one dormer is located on the same side of the roof, the width of all dormers combined may not exceed fifty percent (50%) of the length of the exterior wall next below. See illustrations below.

Appendix C:

ISD Clarification Memorandum,
December 2010

City of Newton

GRADE PLANE REQUIREMENTS

Effective 12/01/10. All plans submitted to the Inspectional Services Department; including plot, drainage and as-built plans will have the following items on the plans:

(including but not limited to)

all structures,
metes and bounds,
lot area,

lot coverage,

open space,

and stamps from the design professional and signatures for each of the stamps.

If required, contour lines at a minimum of 2' intervals.

When submitted if larger than 11X17 and more than 3 pages; there shall be one hard copy and two CD's in PDF format. If the plans are 11X17 or smaller and 3 pages or less; 3 copies on paper will be acceptable.

All plans shall also comply with the City of Newton's Revised Ordinances and the State of Massachusetts Building Code.

Grade Plane:

A reference plane for a building or structure as a whole, representing the average of finished ground level adjoining the building or structure at all exterior walls. In calculating said reference plane, the elevation of each point used to calculate said average shall be determined by using the lowest elevation of finished ground level within the area immediately adjoining the building or structure and either the lot line or a point six (6) feet from the building or structure, whichever is closer to the building or structure.

All site and as-built plans must show the average grade plane and heights of buildings based on the following:

1) Plans are to show two grade points on "each" exterior foundation wall. Such points shall be measured at the lowest point immediately adjoining each wall and a point perpendicular to the first point 6' from the building or structure. If the lot line is less than 6' the second point shall be at the lot line.

2) The average grade plane shall be the average of all walls. Eight points for a four sided building; twelve points for a six sided building; etc....

3) "Exterior wall" in this context shall mean a wall with a length of six feet or greater.

4) 30-5 (c)1 Whenever the existing contours of the land are altered, the land shall be left in a usable condition, graded in a manner to prevent the erosion of soil and the alteration of the runoff of surface water to or from abutting properties, and shall be substantially landscaped. Projects increasing impervious surface area by more than the lesser of a) four (4.0) percent of lot size or b) four hundred (400) square feet, or that involve altering the landscape in such a way that may result in alteration of the

runoff of surface water to abutting properties or erosion of soil, shall be reviewed by the Commissioner of Inspectional Services and the City Engineer to ensure compliance with this section. The Commissioner of Inspectional Services and the City Engineer may reject a project if they believe it will cause runoff of surface water to abutting properties or the erosion of soil.

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5401.3 Drainage. Surface drainage shall be diverted to a storm sewer conveyance or other approved point of collection so as to not create a hazard. Lots shall be graded so as to drain surface water away from foundation walls. The grade away from foundation walls shall fall a minimum of six inches (152 mm) within the first ten feet (3048 mm).


Temporary and finished grading shall be such that surface water runoff, either during or after completion of construction, shall not be directed to, nor create flooding or damage to adjacent property.

Exception: Where lot lines, walls, slopes or other physical barriers prohibit six inches (152 mm) of fall within ten feet (3048 mm), drains or swales shall be provided to ensure drainage away from the structure.

AVERAGE GRADE PLANE

Legend

 Spot Shot At Lowest Point Adjoining Foundation Wall

 Spot Shot At 6 Foot Offset

$$\textcircled{A} \frac{199 + 198.5}{2} = 198.75'$$

$$\textcircled{B} \frac{193.7 + 193.2}{2} = 193.45'$$

$$\textcircled{C} \frac{193.2 + 191.8}{2} = 192.5'$$

$$\textcircled{D} \frac{193.6 + 193.1}{2} = 193.35'$$

$$\textcircled{E} \frac{193.5 + 192.0}{2} = 192.75'$$

$$\textcircled{F} \frac{193.5 + 192.8}{2} = 193.15'$$

$$\textcircled{G} \frac{197.6 + 197.9}{2} = 197.75'$$

$$\textcircled{H} \frac{197.6 + 196.6}{2} = 197.1'$$

$$\text{Average Grade} = 1,558.8 \div 8 = 194.85 \text{ Ft.}$$

